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DIVISION OF  
OIL GAS & MINING

JUMBO MINING CO.  
6305 Fern Spring Cove  
Austin, Texas 78730

M/027/007

Sept. 26, 1991  
File: DOGM92691

Mr. Wayne Hedberg  
Division of Oil, Gas and Mining  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203

RE: Reponse to Division's letter  
July 17, 1991-Review new heap  
pad permit application amend-  
ment at the Drum Mine

Dear Mr. Hedberg:

The following is the information requested by the Division in order for our permit application for a new heap can be processed.

R613-004-105 MAPS, DRAWINGS AND PHOTOGRAPHS

CLAY BORROW PIT

Approximately 30,000 cubic yards of clay will be mined from a borrow pit to be used for the base and secondary liner of the new pad. The borrow pit lies in the NE1/4 SW1/4 of sec. 13 T15S R11W SLM on unpatented claims YC 128 (UMC # 260789) and YC 130 (UMC # 260791) owned by Jumbo Mining. See Map A for location of pit.

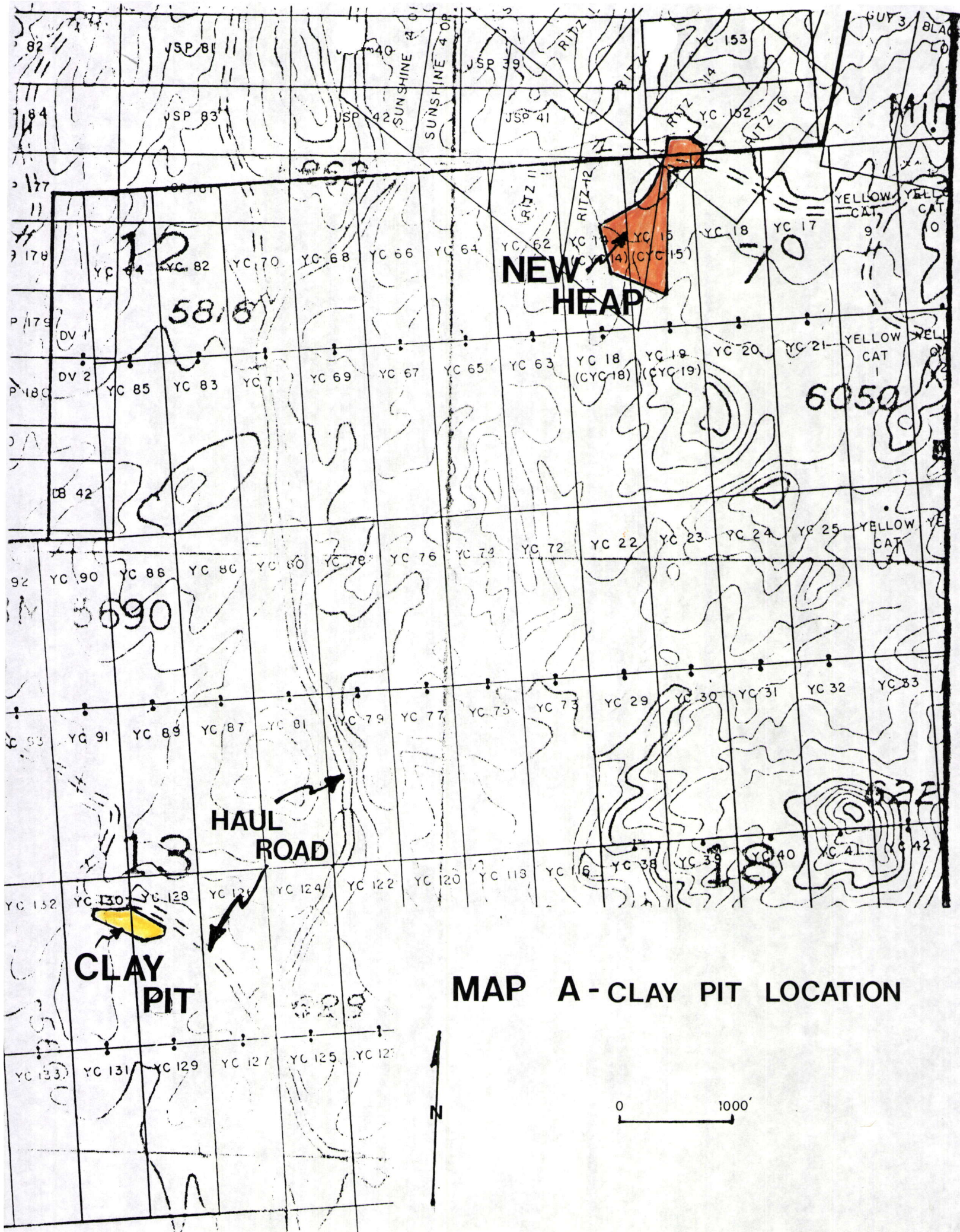
The pit will be 500 feet long, 150 feet wide in the middle and 12 feet deep (see Map B for design). Slopes of the pit will be mined at 3:1 or less. Since the maximum depth of the pit will be 12 feet and slopes will never be greater than 3:1, Jumbo feels that fencing will not be needed but DANGER PIT signs will be posted and a berm between the pit and road will be constructed.

All soil and overburden (1,663 cubic yards) will be stockpiled and eventually spread evenly (0.8 foot deep) back into the pit after completion of clay removal. After backfilling the pit, the area will be ripped and seeded. Soil stockpiles will lie on the sides of small hills away from any drainage

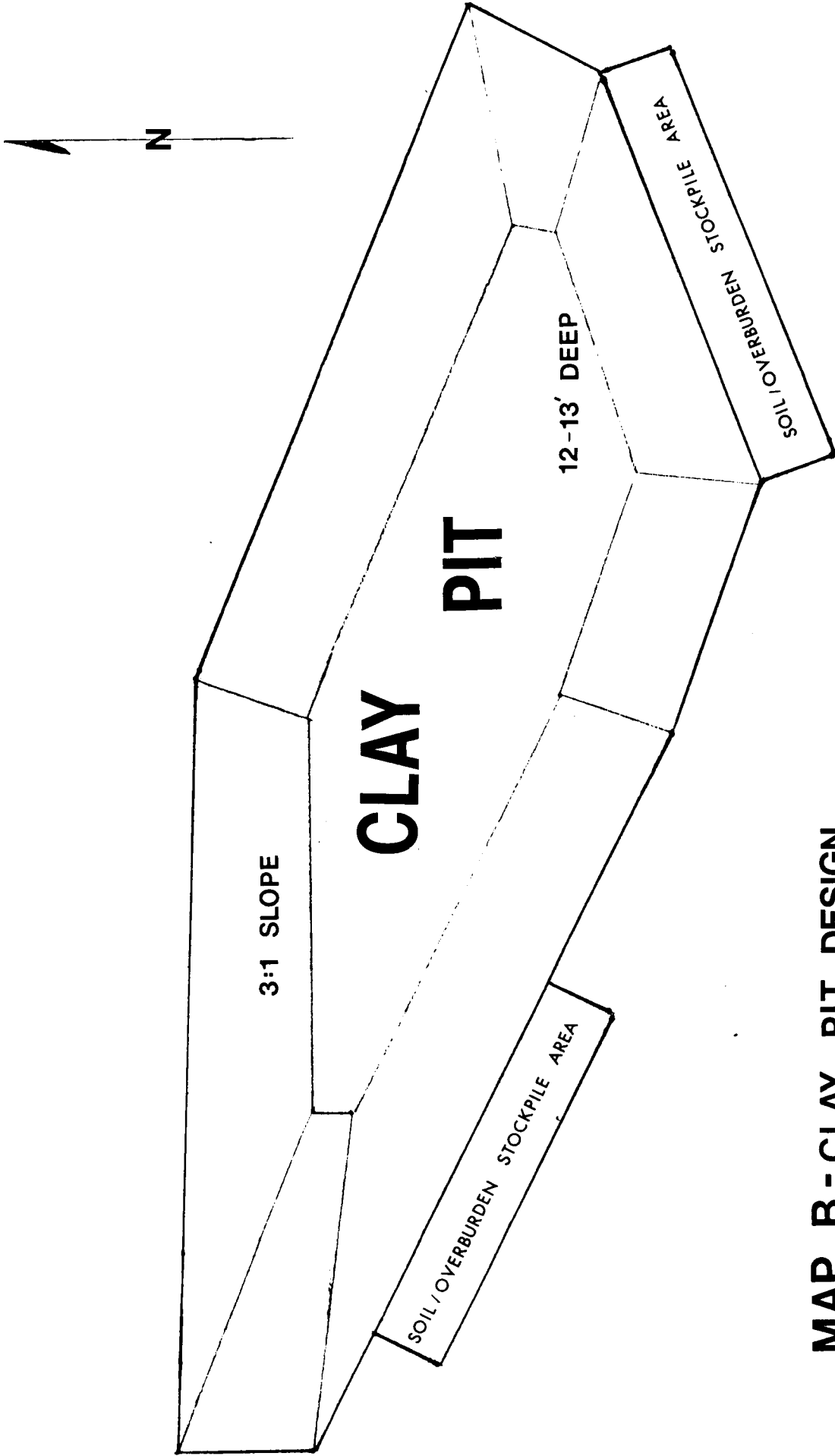
~ 7.2" DEEP 500' X 150'

DO THEY  
MEAN  
SPREADING  
TOPSOIL?









**MAP B - CLAY PIT DESIGN**

Page 2  
Sept. 26, 1991  
Mr. Wayne Hedberg

CLAY AREA  
1.452

and will be posted (SOIL STOCKPILE) to prevent misuse.

Total area to be disturbed (including stockpile area) will be 1.452 acres.

Access roads between the clay pit and the new pad area will be county maintained roads (see Map A) and only minor upkeep will be needed. Water and/or MgCl will be used during hosing for dust control.

#### PERCHED WATER TABLE DRAIN TRENCH

The Division of Water Quality (Dept. of Health) has requested Jumbo to submit a plan for monitoring and containment of the contamination in the perched water table. They suggested that a trench may be built to allow the water to drain into. Jumbo has submitted a plan for a trench to be constructed just to the southwest of the new pad area (see Map C).

⇒ 1,333 CY MATERIAL

The initial design is a trench 150 feet long, 12 feet wide at the bottom and 20 feet deep. The trench may be enlarged if needed. Water will be allowed to drain into the trench and then pumped into our solution ponds. Samples will be collected monthly and analyzed for contaminants with the results sent to the Division of Water Quality quarterly (a copy can be sent to DOGM if requested).

SEED/STABILIZE STOCKPILE?

All soil will be removed and stockpiled. Rock mined from the trench will be backfilled into the trench after the drain is no longer needed for collecting the water. Soil will be placed on top of the backfilled trench, ripped and reseeded.

The trench which will lie inside the Drum Mine fenced area will be bermed during use. Signs will be posted to prevent misuse of the topsoil.

TRENCH  
0.330

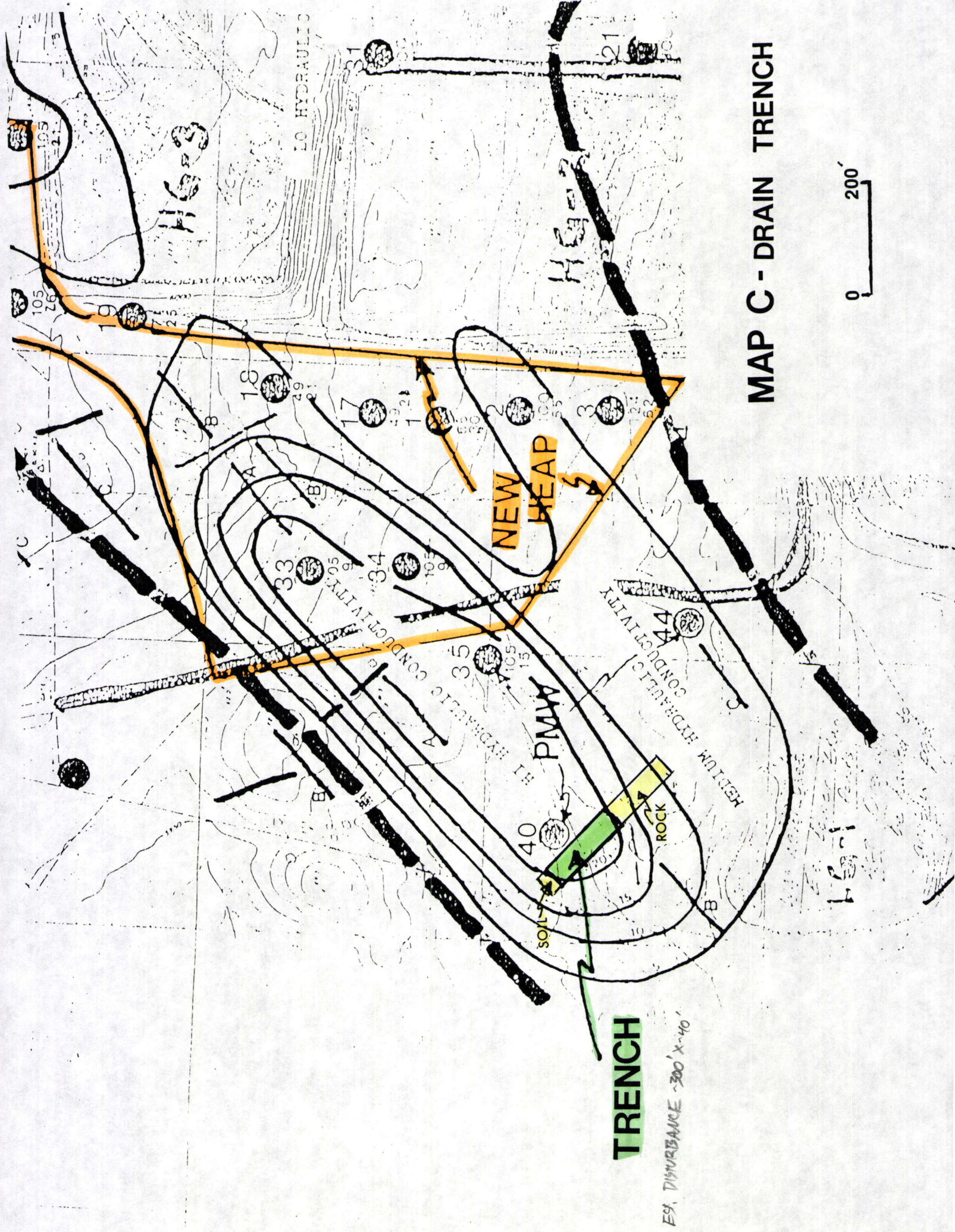
Total acres to be disturbed will be 0.330 acres.

#### R613-004-105.3 MAPS, DRAWINGS AND PHOTOGRAPHS

FIG 5-1?

A cross-section of the new pad/heap design is shown in the accompanying CBC Enviro (consulting engineering firm which designed the new pad) report. The diversion ditch will be 2 feet wide and 2 feet deep which will be made with a backhoe. Cross-section of the ditch is shown on figure 1.





MAP C - DRAIN TRENCH

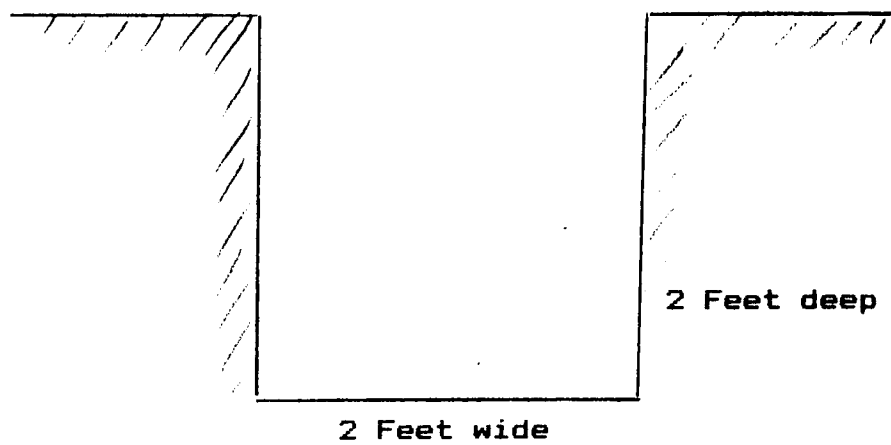
0 200'

TRENCH

ES. DISTURBANCE - 300' X 40'



**Figure 1-DIVERSION DITCH CROSS-SECTION**



Page 3  
Sept. 26, 1991  
Mr. Wayne Hedberg

#### R613-004-106.4 OPERATIONAL PLAN

No waste or overburden will be generated at the new heap site. Current mineable reserves are 600,000 tons but ore extension drilling may increase the amount of ore to 700,000 to 750,000 tons. The new pad will hold approximately 770,000 tons at 2:1 slope and 40 feet high.

The ore for the new heap will originate from the Drum, Alto and Mizpah pits. The additional information required by the Division for the Mizpah permit is accompanying this letter (letter dated 9/19/91).

#### R613-004-106.6 OPERATION PLAN

Topsoil stockpiles will be posted with appropriate signs to prevent misuse of the soil.

#### R613-004-106.8 OPERATION PLAN

The depth of water beneath the new pad area was inferred to be 1465 feet deep or at an elevation of 4510 feet. This depth was projected from ground water contours (potentiometric surface) compiled by the USGS. See Plate 6 in the accompanying letter dated 2/25/91 to the Bureau of Water Pollution Control. This same letter also contains the hydrogeologic, hydrologic, perched aquifer data, monitoring holes, contamination, etc. for the for the new pad area.

#### R613-004-106.9 OPERATION PLAN

The 600,000 tons will be crushed to minus 1" nominal and stacked in four 10-foot lifts. See also the CBC Enviro report.

No waste will be generated in construction of the new pad.

#### R613-004-107.1.12 OPERATIONAL PRACTICES

All trash will be removed to an on-site disposal already approved by the Utah Bureau of Solid and Hazardous Waste.

Generally, the only trash generated on a heap are broken pipe and fittings. These will be picked up by hand and disposed of at our boneyard dump.



Page 4  
Sept. 26, 1991  
Mr. Wayne Hedberg

#### R613-004-107.1.14 OPERATIONAL PRACTICES

NO TRESSPASSING and DANGER CYANIDE signs will be posted at the main gate, on any access routes leading to the new heap and every 200 feet along the fence north of the new heap.

#### R613-004-107.1.15 OPERATIONAL PRACTICES

The existing fence which is a 3 foot high field fence (5x5 mesh) with a single barb wire strand 1 foot higher will be extended to the north in order to enclose the entire mine site including the new heap area. No pits will be made under this application, therefore, no berms will be needed.

#### R613-004-107.2 OPERATIONAL PRACTICES

The new heap area lies at the top of drainage. Since there is only 3.4 acres of watershed above the pad area, it was decided to construct diversion ditches 2 feet wide and 2 feet deep which is more than adequate to divert the 100-year rain on the watershed.

The new pad will be built with dams, gates and berms in order to contain all of the 100-year storm water. See the report by CBC Enviro.

#### R613-004-107.4 OPERATIONAL PRACTICES

When the new pad is being constructed an air gun(s) will be used to keep the wildlife off the exposed plastic liner. During operation a combination of air guns and 1 5/8 by 1 5/8 inch wildlife netting (to cover the exposed ditches) will be used.

#### R613-004-107.4 OPERATIONAL PRACTICES

The only chemicals that will be used during operation are cyanide, lime and antiscalant which will be added to the barren solution and caustic and alcohol being added to the strip solution. Hydrochloric acid may be used to acid wash the carbon.

Even though biodegradable, cyanide is the only potential deleterious material and will be neutralized before reclamation (see neutralization plan discussed below). The lime, caustic, alcohol and acid will be consumed with no long-lasting or deleterious effects. The antiscalant (millsperse)



Page 5  
Sept. 26, 1991  
Mr. Wayne Hedberg

will be used in small quantities and should be consumed in the solution but a sample of the final rinsing water will be sent to the supplier for analysis.

Since ammonium nitrate is used as a blasting agent, there is a possibility of buildup of nitrates in the solution water. Nitrates will be one of the compounds analyzed for in the final rinse water.

#### R613-004-109.2 IMPACT ASSESSMENT

Due to poor construction of the pads by the previous owner, some of the heaps have leaked which contaminated a shallow perched aquifer. Even though the averages of analysis of water samples from the monitoring holes were below protection levels for cyanide, arsenic, etc., the Division of Water Quality is holding Jumbo and/or Western States responsible for the contamination. Jumbo has already applied for a drain trench to be constructed in order to drain and monitor the contamination.

The Division of Water Quality has placed more stringent criteria (double liners with leak detection system) in order to assure that there will be no discharge of solution water.

#### R613-004-109.3 IMPACT ASSESSMENT

All salvageable soil will be stockpile for reclamation.

#### R613-004-109.4 IMPACT ASSESSMENT

HEAP SLOPES  $\leq 2:1$

No heap slopes will be constructed to have an overall slope steeper than 2:1. During reclamation all heap slopes will be recontoured to 3:1 or less.

#### R613-004-109.5 IMPACT ASSESSMENT

In order to minimize air pollution (1) haul roads will be watered and treated with brine solution ( $MgCl$ ), (2) water sprays will be placed on the crushers and (3) water will be sprayed (if needed) on the ore in order to minimize dust at transfer points.

The current requirements of the revised air quality permit (1/28/91) are:

1. Visible emissions shall not exceed the following



Page 6  
Sept. 26, 1991  
Mr. Wayne Hedberg

values:

- a. crushers--15% opacity
  - b. screens--10% opacity
  - c. conveyor transfer points--10% opacity
  - d. conveyor drop points--20% opacity
  - e. diesel engines--20% opacity
  - f. drilling--20% opacity
  - g. waste dumping--20% opacity
  - h. cyanide mixing--5% opacity
  - i. other points--20% opacity
2. Roads shall be watered and/or chemically treated.
  3. Water sprays shall be installed on crushers and screens.
  4. Sulfur content of any oil burned shall not exceed 0.5% sulfur by weight.
  5. Moisture content of the rock shall be no less than 4% by weight. Presoaking of ore may be required.
  6. The pH of the leaching solution shall be not less than 10.0
  7. The front-end loading operations shall minimize fugitive emissions by keeping the drop distance as small as possible.

#### R613-004-110.2 RECLAMATION PLAN

The slopes of the new heap will be constructed to have an overall slope between 2:1 and 3:1. All slopes will be reclaimed to a final 3:1.

All roads not constructed in solid bedrock will be ripped during reclamation.

-PLACE FINES ON ROADS IN BEDROCK?

#### R613-004-110.4 RECLAMATION PLAN

In general, neutralization and closure (decommissioning) for the new heap will consist of the following:

1. Heaps will be rinsed with recycled fresh water until the effluent is below the protection limits for cyanide(CN) and other possible contaminants.



- WHAT ABOUT LINER?  
LEAK DETECTION PIPING?  
LEACHATE COLLECTION PIPING?

Page 7  
Sept. 26, 1991  
Mr. Wayne Hedberg

There will be alternating periods of rinsing and resting in order to take advantage of natural degradation. Rinse rates will vary between high volume (to assure complete saturation and less possibility of short circuiting) and low volume to assure that the effluent from clay zones (slow diffusion of CN of saturated solids) is not being greatly diluted with effluent from high permeability zones. During the later part of the resting period, the draindown will be sampled (draindown water would be from areas having slow diffusion rates). If high CN occurs in the effluent, then neutralization chemicals (e.g. HCL, peroxide, etc.) will be added.

2. Any rock which is to be recontoured off the pad liner will be sampled and evaluated by the Meteoric Water Mobility Test (see exhibit A for procedure). The results of the test will determine if additional rinsing and/or neutralization is needed.

WHAT DEPTH?  
WHAT AMOUNT?  
FROM WHERE?

3. Topsoiling for reclamation will provide a partial capping and diversion of meteoric waters.

- PARTIAL  
CAPPING ONLY?  
ACCEPTABLE?

#### R613-004-111.2 RECLAMATION PRACTICES

Diversion ditches (2 feet deep and 2 feet wide) will be constructed in solid bedrock. They are planned to divert rain water from a 3.4 acre watershed above the new pad area. Being built in solid rock, erosion should be minimal and will have long term stability.

If DOGM decides that these ditches are not needed after neutralization and reclamation of the new heap, then Jumbo will reclaim them by backfilling, topsoiling and reseeding.

#### R613-004-111.3 RECLAMATION PRACTICES

Diversion ditches will control any runoff from entering the disturbed area, therefore, erosion could only come from direct rainfall. The clay base and liner will protect the underlying material from erosion. Ore for the heap is generally silicified with very little fine material. Any fine material usually compacts during sprinkling of process solution (sprinkling rates are sometimes higher than the 100yr rain event). Regrading sides of the heap to a stable slope(3:1) and topsoiling should minimize erosion.



Page 8  
Sept. 26, 1991  
Mr. Wayne Hedberg

R613-004-111.6 RECLAMATION PRACTICES

Jumbo will reclaim all heap slopes to 3:1 or less.

R613-004-111.7 RECLAMATION PRACTICES

There will be no pit walls developed under this application.

R613-004-111.8 RECLAMATION PRACTICES

Roads and pads will be ripped, not just scarified, upon final reclamation.

R613-004-111.10 RECLAMATION PRACTICES

There will be no pits constructed under this application for a new heap. See under R613-004-105 above for reclamation of the aquifer drain trench.

R613-004-111.11 RECLAMATION PRACTICES

The only structures and equipment in the heap area will be a crusher, conveyor belts and other crushing support equipment which will be supplied by an outside contractor. This equipment will be shipped off the property after completion of crushing.

The sprinkler and piping system will be removed to other projects or sold. All trash (broken pipe and fittings) will be hauled to the boneyard (approved/permittted onsite disposal facility).

R613-004-111.12 RECLAMATION PRACTICES

The topsoil will be reapplied to a uniform depth of 6 inches minimum. ————— EVERYWHERE? ⇒ WHAT VOLUME?

R613-004-113 SURETY

The following is the revised surety estimate:

<u>Description</u>	<u>Amount</u>	<u>\$/Unit</u>	<u>Cost-\$</u>
Ripping new roads	0.72 Ac	545	392



Page 9  
Sept. 26, 1991  
Mr. Wayne Hedberg

Contouring and regrading heap sides	7.91 Ac	394	3,116
Backfill drain trench	3,200 Tons	0.25	800
Spread topsoil on heap	15,606 CY	0.68	10,612
Spread topsoil-clay pit	1,663 CY	0.68	1,131
Spread topsoil-drain trench	134 CY	0.68	91
Clean up & remove trash	17.77 Ac	47	835
Scarify and seed	9.08 Ac	286	2,597
Constuct berm-clay pit	500 Ft	1.20	600
	SUBTOTAL		20,174
	+10% CONTINGENCY		2,017
	SUBTOTAL		22,191
	+5 yr ESCALATION(1.84%)		2,118
	TOTAL		24,309

Also accompanying this letter are copies of letters (2-25-91, 6-11-91 and 9-9-91) to the Dept. of Health, 9-11-91 to BLM and a copy from Dept. of Health (7-22-91) to Jumbo (Draft Ground Water Discharge Permit for Leach Pad H-10).

If you have any questions, feel free to call me at the mine site (801-864-4697) or leave a message/fax (801-864-4365).

Sincerely,


  
Dave Hartshorn  
Project Manager-Drum Mine



EXHIBIT A  
METEORIC WATER MOBILITY TEST

Collect a representative sample of the material. The minimum sample size for this procedure is 5 kilograms. If the material to be sampled has particle sizes greater than 5 centimeters, sufficient material must be classified to provide 5 kilograms of sample with maximum particle size less than 5 centimeters. This classified sample is placed in an extraction device which allows the sample to be continuously wetted by circulation of the synthetic meteoric water (lixiviant). The volume of the synthetic meteoric water must be equal in weight to the weight of the classified sample plus the additional volume necessary to saturate the sample. The lixiviant is circulated, agitated, or mixed for 24 hours, continuously wetting the full surface of the sample. For this procedure the lixiviant is laboratory grade water whose hydrogen ion activity (pH) has been adjusted to between pH 5.5 and 6.0 with reagent grade nitric acid before charging it to the extraction device. No further adjustment of the pH during extraction is required. One hour after ceasing to circulate, a sample of the lixiviant is decanted and prepared for analysis. Analysis shall be performed for the constituents listed at the end of this procedure. Elements for which a standard has been established shall have a lower level of quantification equal to or less than that standard.

The extraction device can be a packed column with small recycle reservoir or bottle roll or large barrel fitted with internal circulation/agitation or equivalent.

The information to be recorded and reported is:

1. The procedure used to collect a representative sample.
2. The adjusted pH of original lixiviant;



3. The final pH of fluid after mixing;
4. Percentage of sample passing 200 mesh;
5. Total weight of solid sample;
6. Moisture required to saturate sample;
7. Time of contact in extraction device;
8. Synopsis of the technique and equipment used to leach sample, i.e., column, batch, etc.; and
9. Results of the analysis of the lixiviant after ending the extraction.

Alkalinity  
Aluminum  
Antimony  
Arsenic  
Barium  
Beryllium  
Bismuth  
Cadmium  
Calcium  
Chloride  
Chromium  
Cobalt  
Copper  
Fluoride

Gallium  
Iron  
Lead  
Lithium  
Magnesium  
Manganese  
Mercury  
Molybdenum  
Nickel  
Nitrate  
pH  
Phosphorus  
Potassium

Scandium  
Selenium  
Silver  
Sodium  
Strontium  
Sulfate  
Thallium  
Tin  
Titanium  
Total Dissolved Solid  
Vanadium  
\*WAD CN  
Zinc

\* When Appropriate

HvD/tjd/sld:56  
revised 9/19/90



